

WHAT IS CLAIMED IS:

1. A battery charger comprising:
 - a first input configured to accept DC power from an AC adapter;
 - a second input configured to accept DC power from a Universal Serial Bus power interface;
 - a first output configured to provide power to a system load;
 - a second output configured for connection to a battery;
 - a first isolation circuit coupled between the first input and the first output to prevent current flow in a reverse direction to the first input;
 - a second isolation circuit and a current sensing circuit coupled in series between the second input and the first output, wherein the second isolation circuit prevents current flow in a reverse direction to the second input, and the current sensing circuit measures the current flow from the Universal Serial Bus power interface;
 - a pass element coupled between the first output and the second output, wherein the pass element conducts a charging current in a first direction to the second output during charging of the battery; and
 - a charging controller configured to linearly regulate the charging current of the pass element based on the current flow from the Universal Serial Bus power interface.
2. The battery charger of Claim 1, further comprising a current limiting circuit coupled between the Universal Serial Bus power interface and the second input.
3. The battery charger of Claim 1, further comprising:
 - a first bypass transistor coupled across the first isolation circuit; and
 - a second bypass transistor coupled across the second isolation circuit, wherein the first bypass transistor and the second bypass transistor are selectively enabled to couple an output of the AC adapter or an output of the Universal Serial Bus power interface to the first output.
4. A battery controller comprising:
 - a pass element coupled between a system power terminal and a battery terminal;

a battery control loop that senses a voltage difference between the system power terminal and the battery terminal, wherein the battery control loop outputs a feedback control signal based on the voltage difference; and

a pass element driver that accepts the feedback control signal, wherein the pass element driver linearly regulates current conducted by the pass element using the feedback control signal.

5. The battery controller of Claim 4, wherein the pass element is a P-channel enhancement mode MOSFET with a source terminal coupled to the system power terminal and a drain terminal coupled to the battery terminal.

6. The battery controller of Claim 4, wherein the pass element is a MOSFET with a configurable body contact.

7. The battery controller of Claim 4, wherein power is selectively provided to the system power terminal by an AC adapter or a USB power interface.

8. The battery controller of Claim 7, further comprising:

a current sensor that outputs a current sense voltage indicative of the level of current supplied by the USB power interface to the system power terminal; and

an error amplifier that compares the current sense voltage to a reference level and overrides the feedback control signal to reduce the current conducted by the pass element when the current sense voltage exceeds the reference level.

9. A method for controlling battery power comprising the acts of:

selectively providing a first external power source or a second external power source to a device coupled to a system power terminal;

coupling an internal battery to the system power terminal via a series-connected transistor; and

charging the internal battery by regulating the transistor to conduct a charging current in a first direction from the system power terminal to a positive battery terminal during a charging mode, wherein the charging current is linearly adjusted to prevent a supply current from exceeding a predefined threshold.

10. The method of Claim 9, further comprising the act of discharging the internal battery by regulating the transistor to conduct a discharging current in a second direction from the positive battery terminal to the system power terminal during a discharging mode.

11. The method of Claim 9, wherein the impedance of the transistor varies to limit the level of the charging current.

12. The method of Claim 9, wherein the charging mode occurs when the voltage on the system power terminal is greater than the voltage of the internal battery.

13. The method of Claim 10, wherein the discharging mode occurs when the voltage on the system power terminal is less than the voltage of the internal battery.

14. The method of Claim 10, wherein the discharging mode occurs in response to a discharge command.

15. A Universal Serial Bus battery charger comprising:

means for selectively coupling a Universal Serial Bus power interface to a system power terminal of a portable device;

means for coupling a battery to the system power terminal through a pass element;

means for sensing an input current at the Universal Serial Bus power interface;
and

means for linearly controlling the current conducted by the pass element to ensure that the input current is less than a predetermined limit.